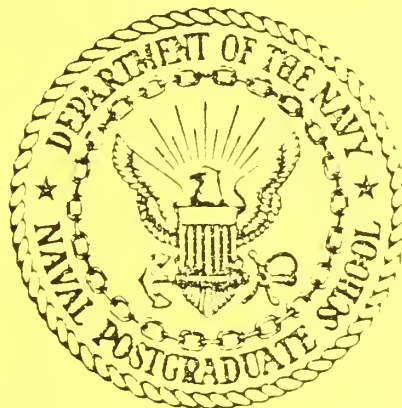


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HYDROGRAPHIC DATA FROM THE OPTOMA PROGRAM
OPTOMA3
10 FEBRUARY, 1983

by

Marie C. Colton
Michele M. Rienecker
Paul A. Wittmann
Edward A. Kelley, Jr.
Christopher N.K. Mooers

January 1985

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*Hydrographic Data from the **OPTOMA** Program:*
OPTOMA3

10 February, 1983

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The **OPTOMA** Program is a joint program of

Department of Oceanography
Naval Postgraduate School
Monterey, CA 93943.

Center for Earth and Planetary Physics
Harvard University
Cambridge, MA 02138.

TABLE OF CONTENTS

	PAGE
LIST OF FIGURES	ii
INTRODUCTION	2
DATA ACQUISITION	2
DATA PROCESSING	3
DATA PRESENTATION	3
ACKNOWLEDGEMENTS	22
INITIAL DISTRIBUTION LIST	23

LIST OF FIGURES

<i>Figure No.</i>	<i>Caption</i>	<i>Page</i>
1.	The NOCAL and CENCAL subdomains of the OPTOMA Program. Isobaths are shown in meters.	1
2.	Cruise track for OPTOMA3 with transect extremes identified by letter.	5
3.	AXBT locations for OPTOMA3.	6
4.	Station numbers for OPTOMA3.	7
5(a)-(d).	Staggered temperature profiles from the AXBT's. Profiles are staggered by a multiple of 5C (OPTOMA3).	10
6(a)-(h).	Isotherms from the AXBT's. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow (OPTOMA3).	14
7.	Profiles of $\bar{T}(z)$ with + and - the standard deviation (OPTOMA3).	21

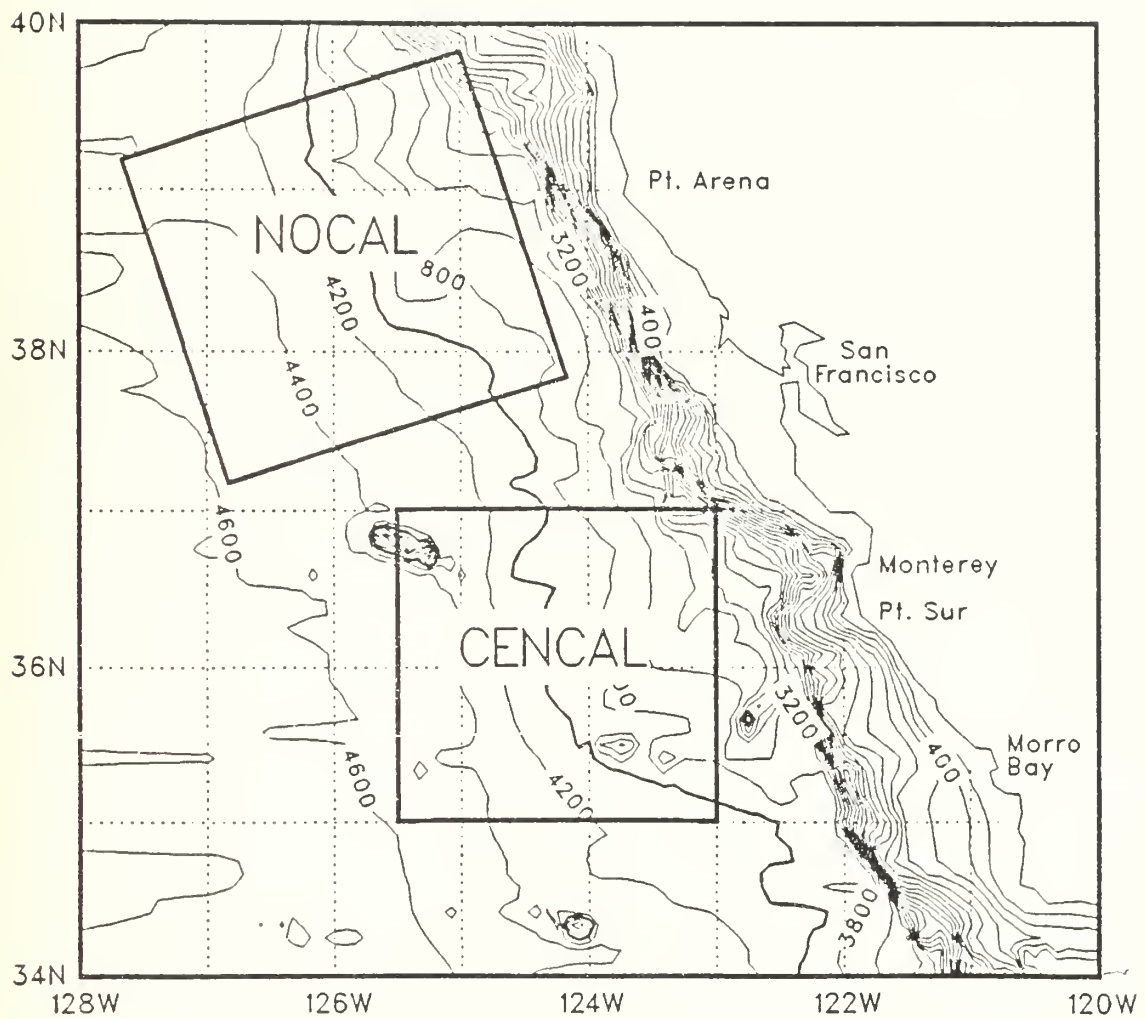


Figure 1: The NOCAL and CENCAL subdomains of the OPTOMA Program. Isobaths are shown in meters.

INTRODUCTION

The OPTOMA (Ocean Prediction Through Observations, Modeling and Analysis) Program, a joint NPS/Harvard program sponsored by ONR, seeks to understand the mesoscale (front, eddies, and jets) variability and dynamics of the California Current System and to determine the scientific limits to practical mesoscale ocean forecasting. To help carry out the aims of this project, a series of cruises and flights has been planned in two subdomains, NOCAL and CENCAL, shown in Figure 1.

The flight OPTOMA3 was carried out on 10 February, 1983 by a Navy Patrol wing and covered the CENCAL domain which is roughly 250 km square centered about 200 km off Pt. Sur CA. Bathythermographic data were acquired along the tracks shown in Figure 2. The areal coverage was roughly 300 km cross-shore by 300 km alongshore. The vertices of the cross-shore diagonals were separated by one degree latitude, or about 110 km, and the alongtrack station spacing was about 30 km.

DATA ACQUISITION

During OPTOMA3 a shallow (305m) or deep (760m) Sippican Airborne Expendable Bathythermograph (AXBT) was deployed at each station from a Navy P3 aircraft. The aircraft maintained an altitude of approximately 1500 ft and an airspeed of 210 knots during the drops. To minimize spatial separation, the average time between stations was 4.5 minutes, which resulted in truncation of some of the deep AXBT's which transmit for 7 minutes or more. The AXBT profiles were recorded on audio tapes, using the onboard 16-channel audio recorder, and as analog traces using two lofargram recorders which operated on UHF channels 14 and 16.

Station positions were obtained from the aircraft's Inertial Navigation System with hourly updates by radar and Tacan; accuracy of position is within 1 km. The thermistor on the Sippican AXBT has an accuracy of $\pm 0.18^{\circ}\text{C}$ in temperature and $\pm 2\%$ or 5m (whichever is greater) in depth.

DATA PROCESSING

The data presented in this report are the result of visual digitization of the analog traces using a gridded template overlay. This procedure yields approximately 25 to 30 points per profile with accuracies in temperature and depth of $\pm 0.25^{\circ}\text{C}$ and $\pm 6.25\text{m}$, respectively. These data were then transferred to the IBM 3033 mainframe at the Naval Postgraduate School and edited by removing obvious AXBT failures that were not identified during the flight or digitization procedure. Of the 70 AXBTs deployed, 8 outright instrument failures and 1 suspected failure were edited from the final data set, yielding a retention percentage of about 87%.

The data have been transferred on digital tape to the National Oceanographic Data Center in Washington, DC.

DATA PRESENTATION

The cruise track, station locations and station numbers are shown in Figures 2, 3, and 4, respectively. These figures are followed by Table 1 containing a listing of the stations, with their coordinates, and the date and time at which each station was occupied.

Vertical profiles of temperature from the AXBT deployments are shown in staggered fashion in Figure 5. The location of these profiles may be found by reference to the various maps of the cruise track. Transect extremes are

identified as nearly as possible. The first profile on each plot is shown with its temperature unchanged; to each subsequent profile an appropriate multiple of 5C has been added.

Isotherms for each transect are shown in Figure 6. Based on instrument accuracy and the vertical temperature gradient, it is estimated that the depths of isotherms in the main thermocline are uncertain to $\pm 20\text{m}$. The tick marks identify station positions, and again, the transect extremes are shown on these plots. The data presentation concludes with Figure 7 which consists the mean temperature profile, with standard deviation envelope, from the AXBT's.

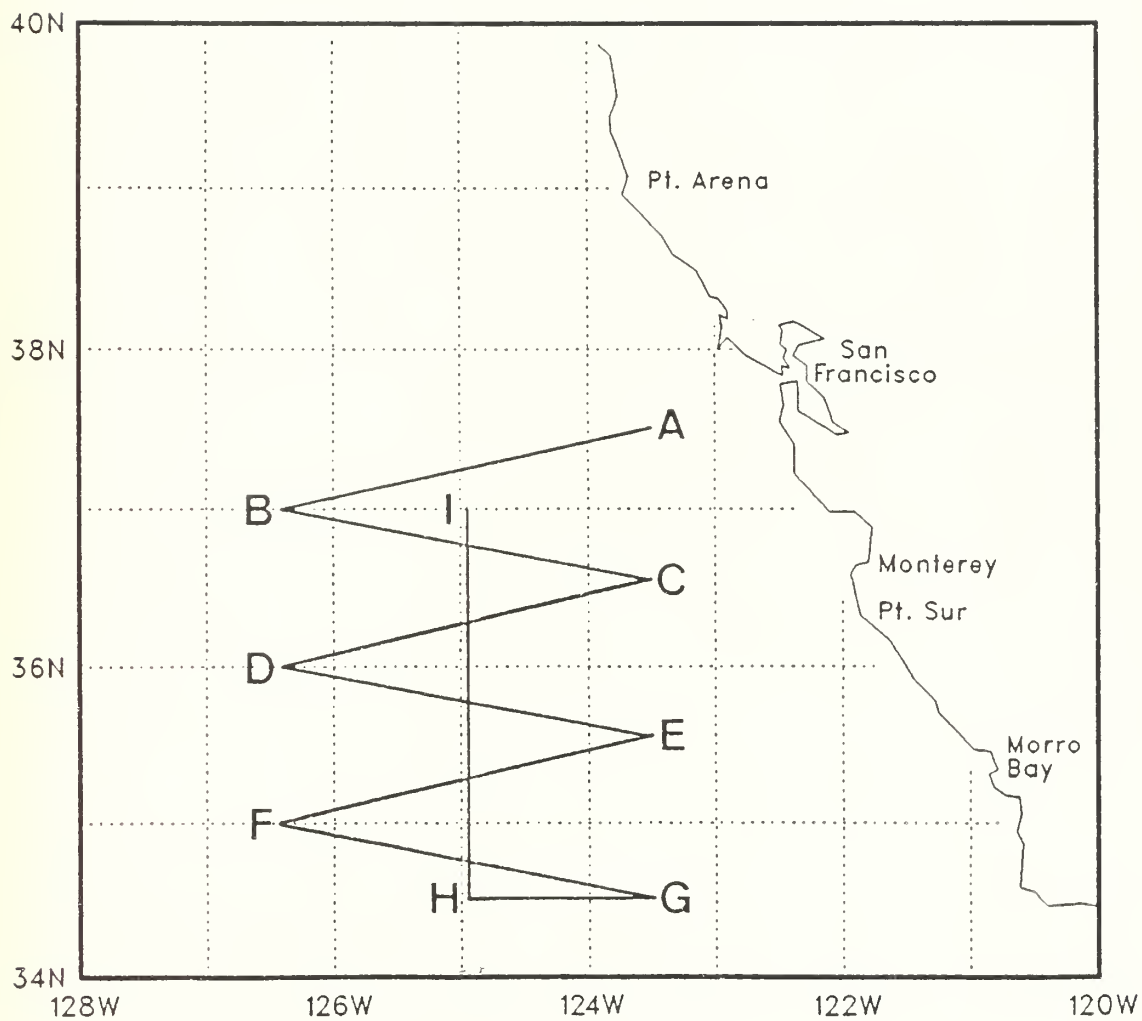


Figure 2: Cruise track for OPTOMA3 with transect extremes identified by letter.

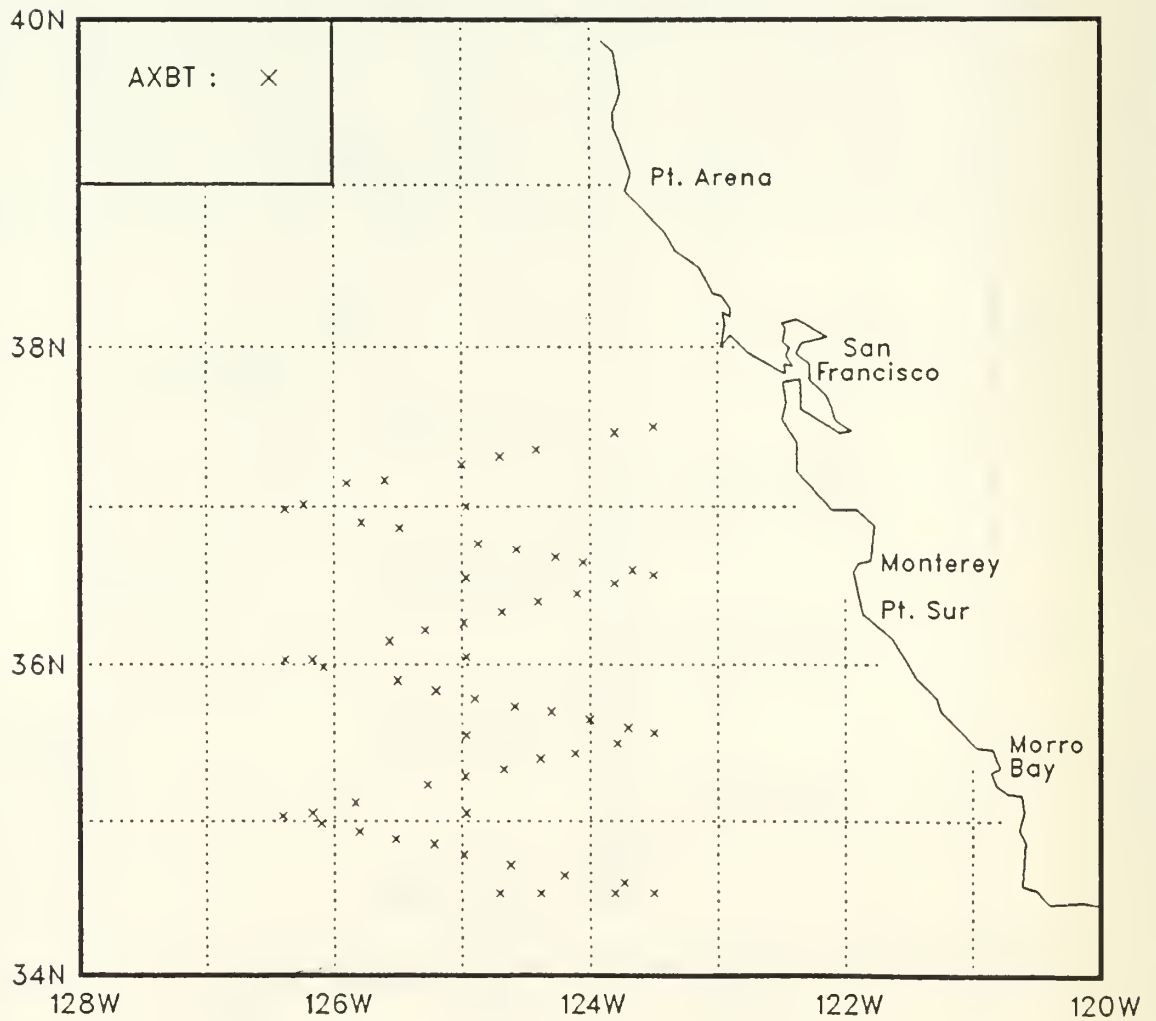


Figure 3: AXBT locations for OPTOMA3.

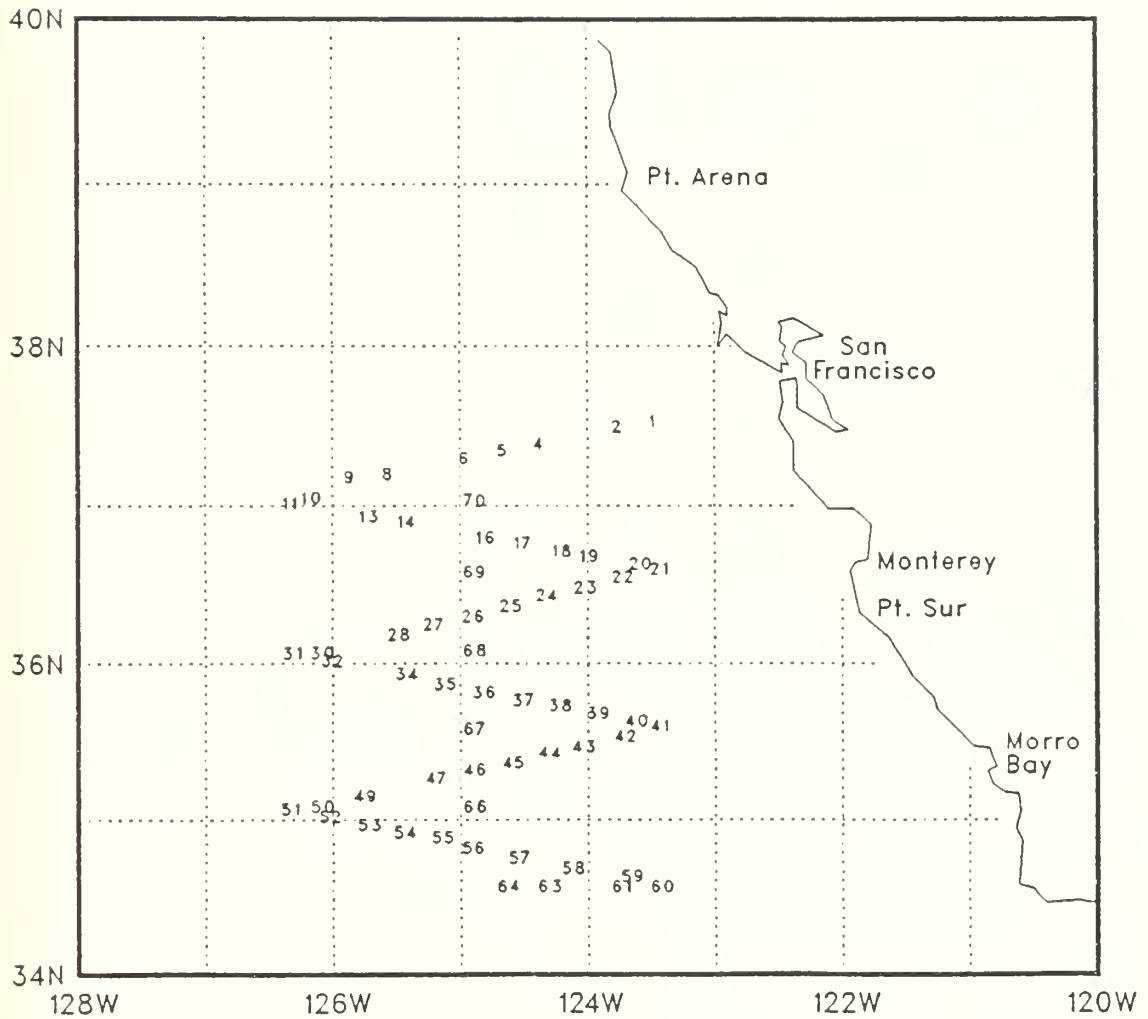


Figure 4: Station numbers for OPTOMA3.

Table 1: Station Listing

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)
1	AXBT	83041	1726	37.30	123.30	13.9
2	AXBT	83041	1737	37.28	123.48	13.7
4	AXBT	83041	1745	37.21	124.25	12.7
5	AXBT	83041	1749	37.19	124.42	13.1
6	AXBT	83041	1753	37.16	125.00	13.1
8	AXBT	83041	1801	37.10	125.36	12.7
9	AXBT	83041	1806	37.09	125.54	12.8
10	AXBT	83041	1811	37.01	126.14	12.8
11	AXBT	83041	1815	36.59	126.23	12.5
13	AXBT	83041	1823	36.54	125.47	13.2
14	AXBT	83041	1828	36.52	125.29	12.9
16	AXBT	83041	1840	36.46	124.52	13.1
17	AXBT	83041	1844	36.44	124.34	13.2
18	AXBT	83041	1848	36.41	124.16	13.2
19	AXBT	83041	1851	36.39	124.03	13.2
20	AXBT	83041	1857	36.36	123.40	14.9
21	AXBT	83041	1905	36.34	123.30	14.7
22	AXBT	83041	1909	36.31	123.48	14.5
23	AXBT	83041	1914	36.27	124.06	14.1
24	AXBT	83041	1918	36.24	124.24	14.0
25	AXBT	83041	1936	36.20	124.41	14.0
26	AXBT	83041	1940	36.16	124.59	13.5
27	AXBT	83041	1945	36.13	125.17	13.1
28	AXBT	83041	1949	36.09	125.34	13.0
30	AXBT	83041	1959	36.02	126.10	13.3
31	AXBT	83041	2032	36.02	126.23	14.0
32	AXBT	83041	2036	35.59	126.05	13.2
34	AXBT	83041	2045	35.54	125.30	13.2
35	AXBT	83041	2049	35.50	125.12	14.5
36	AXBT	83041	2053	35.47	124.54	14.0
37	AXBT	83041	2057	35.44	124.35	14.8
38	AXBT	83041	2101	35.42	124.18	13.8
39	AXBT	83041	2105	35.39	124.00	14.3
40	AXBT	83041	2109	35.36	123.42	14.3
41	AXBT	83041	2116	35.34	123.30	14.1
42	AXBT	83041	2121	35.30	123.47	14.0
43	AXBT	83041	2125	35.26	124.07	14.2
44	AXBT	83041	2129	35.24	124.23	14.0
45	AXBT	83041	2134	35.20	124.40	14.8

STN	TYPE	YR/DAY	GMT	LAT (NORTH) (DD.MM)	LONG (WEST) (DDD.MM)	SURFACE TEMP (DEG C)
46	AXBT	83041	2138	35.17	124.58	14.4
47	AXBT	83041	2245	35.14	125.16	14.4
49	AXBT	83041	2255	35.07	125.50	15.5
50	AXBT	83041	2300	35.03	126.10	15.0
51	AXBT	83041	2304	35.02	126.24	15.1
52	AXBT	83041	2309	34.59	126.06	15.2
53	AXBT	83041	2313	34.56	125.48	15.0
54	AXBT	83041	2317	34.53	125.31	14.9
55	AXBT	83041	2320	34.51	125.13	15.0
56	AXBT	83041	2324	34.47	124.59	15.2
57	AXBT	83041	2327	34.43	124.37	14.9
58	AXBT	83041	2353	34.39	124.12	14.0
59	AXBT	83041	2358	34.36	123.44	15.1
60	AXBT	83042	11	34.32	123.30	14.3
61	AXBT	83042	15	34.32	123.48	14.1
63	AXBT	83042	23	34.32	124.23	14.0
64	AXBT	83042	27	34.32	124.42	14.8
66	AXBT	83042	40	35.03	124.58	15.0
67	AXBT	83042	48	35.33	124.58	15.0
68	AXBT	83042	55	36.03	124.58	14.3
69	AXBT	83042	103	36.33	124.58	13.2
70	AXBT	83042	110	37.00	124.58	13.1

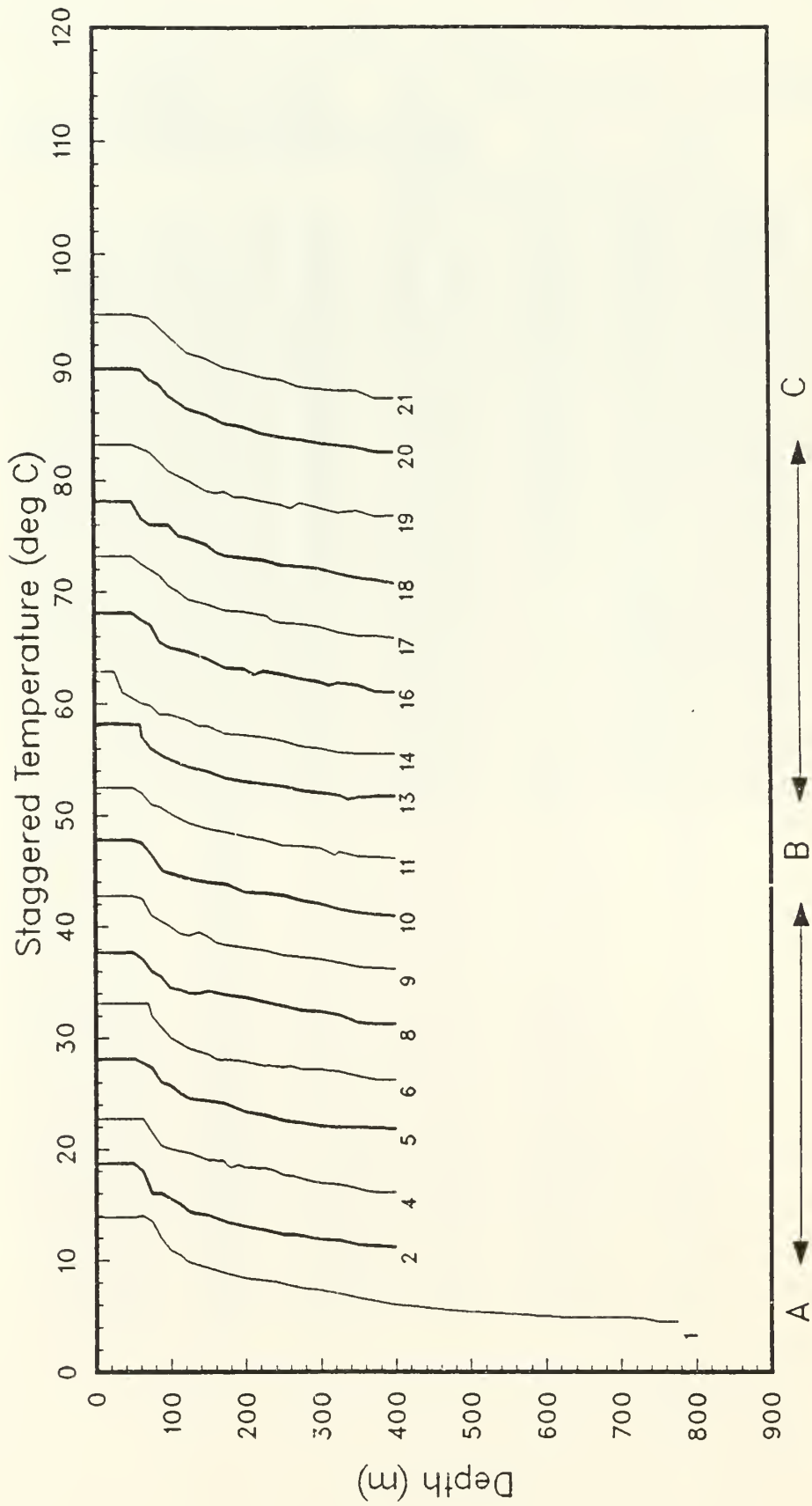


Figure 5(a): Staggered temperature profiles from the AXBT's.
Profiles are staggered by a multiple of 5C (OPTOMA3).

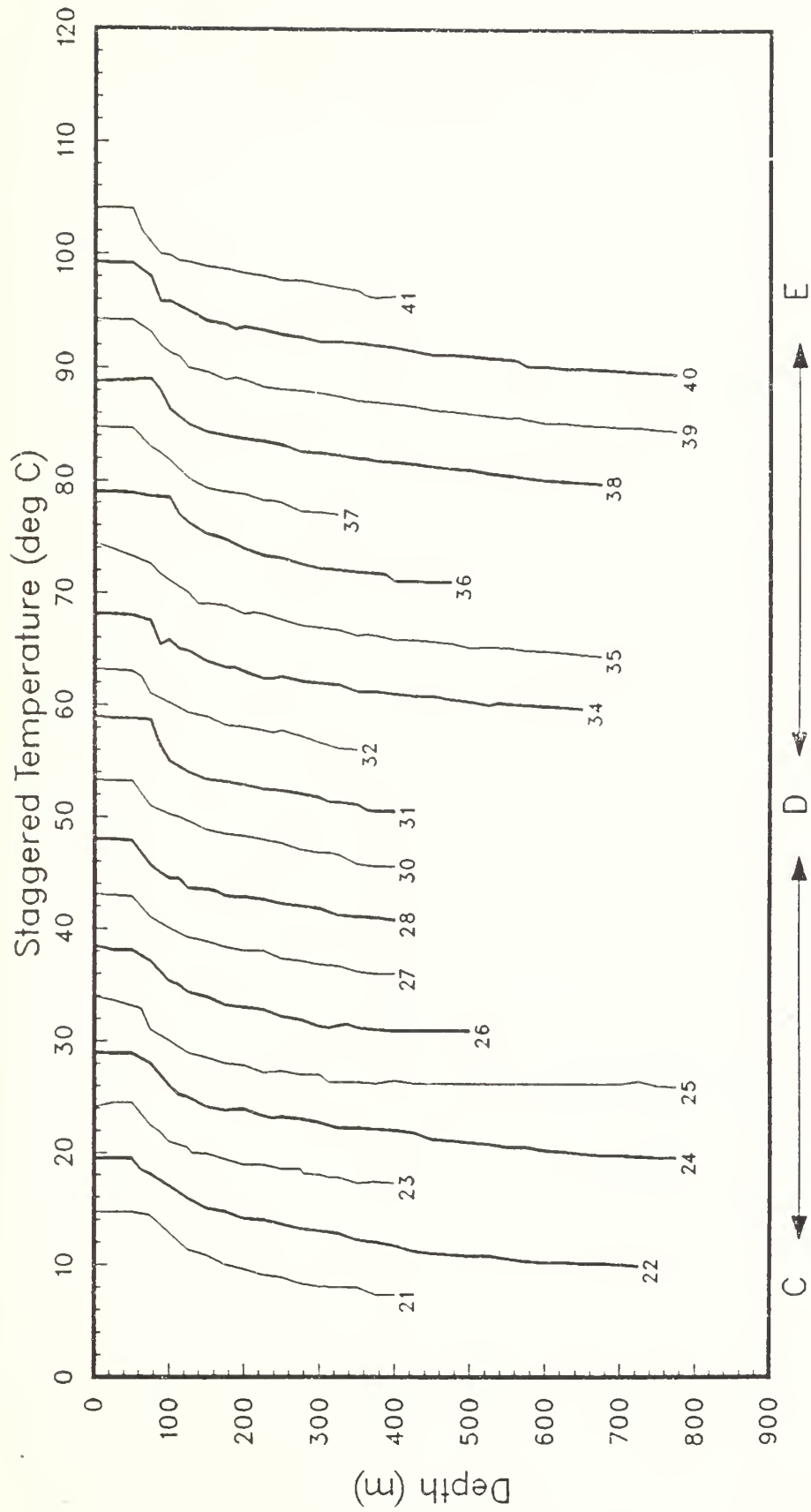


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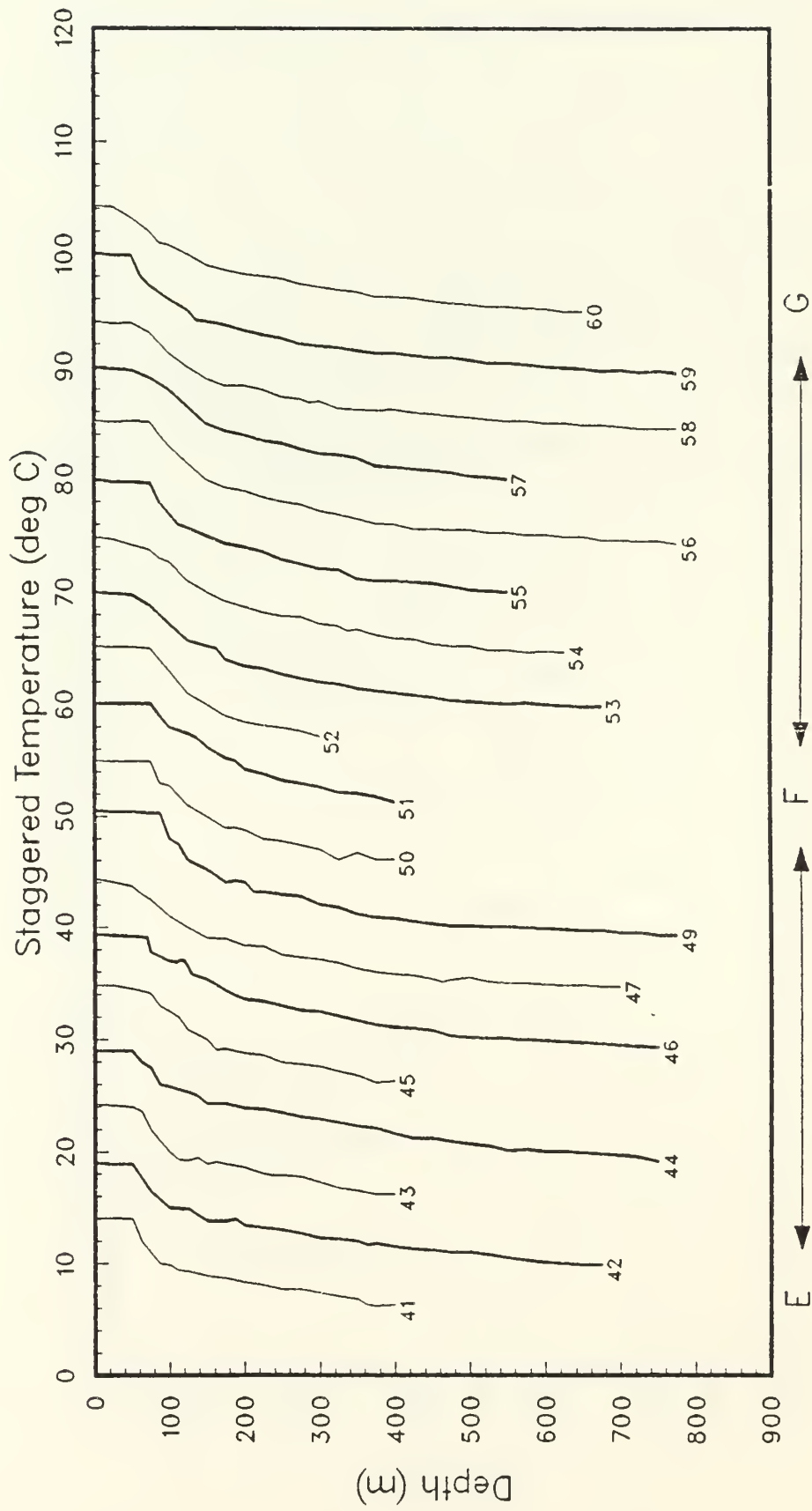


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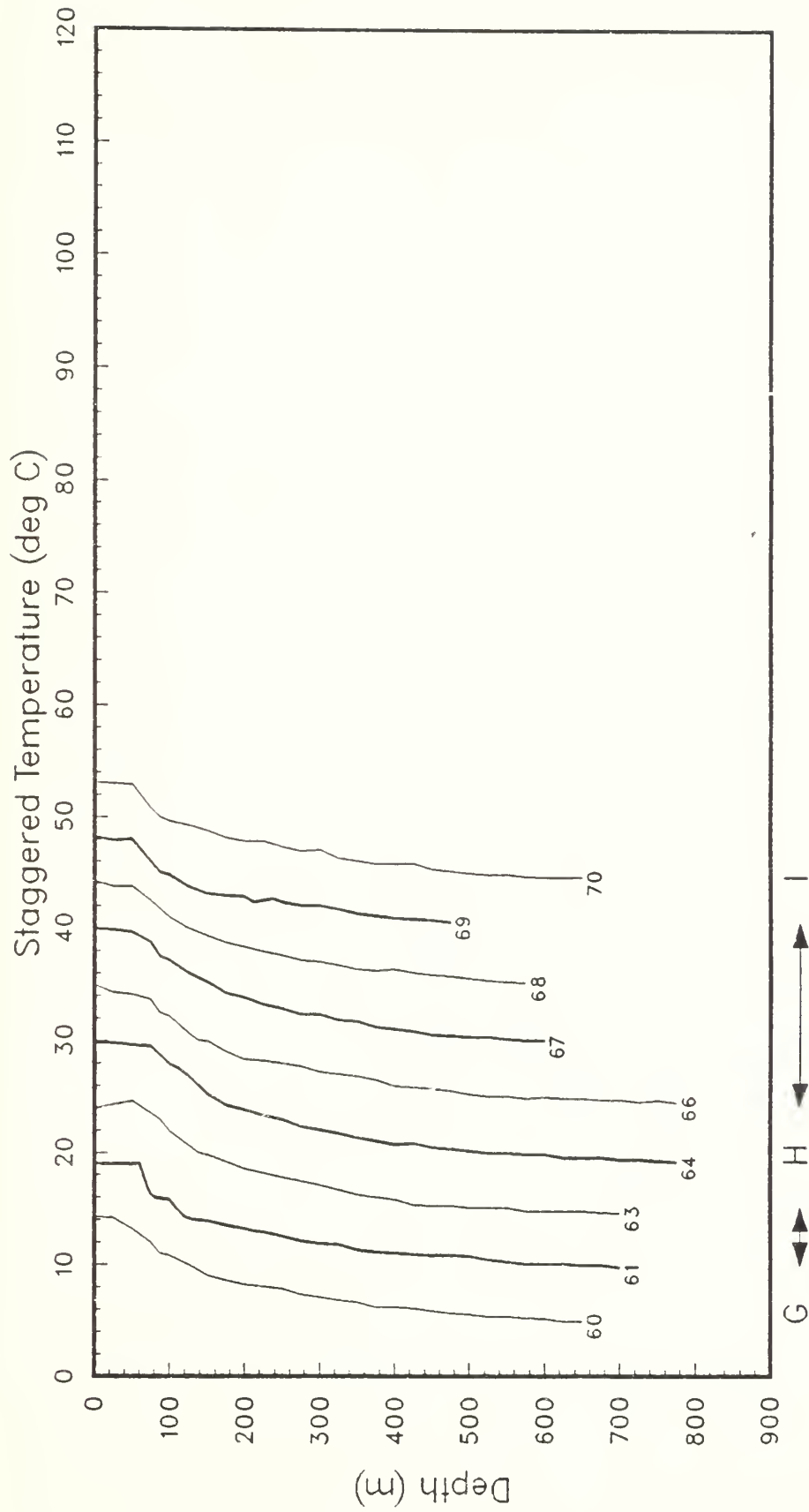


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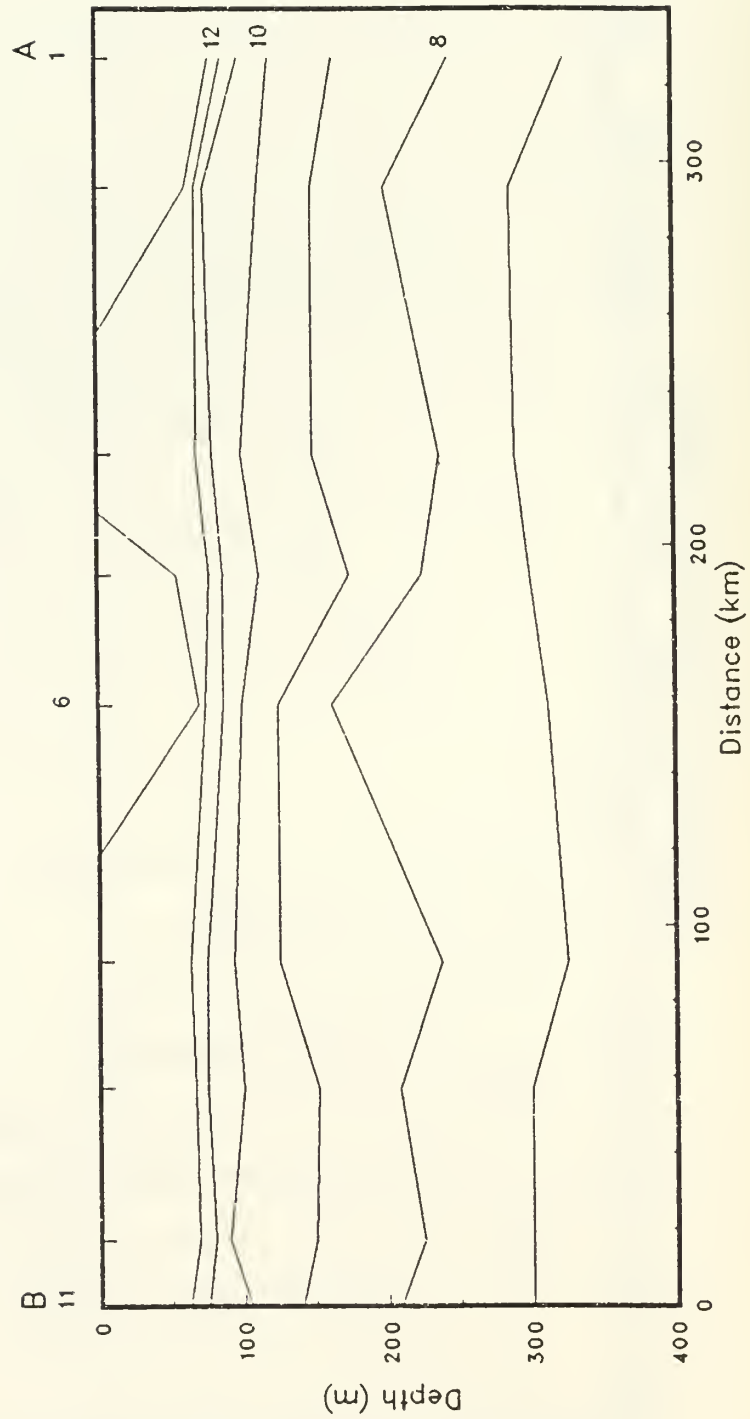


Figure 6(a): Isotherms from the AXBT's. Tick marks along the upper horizontal axis show station positions. Some station numbers are given. Dashed lines are used if the cast was too shallow (OPTOMA3).

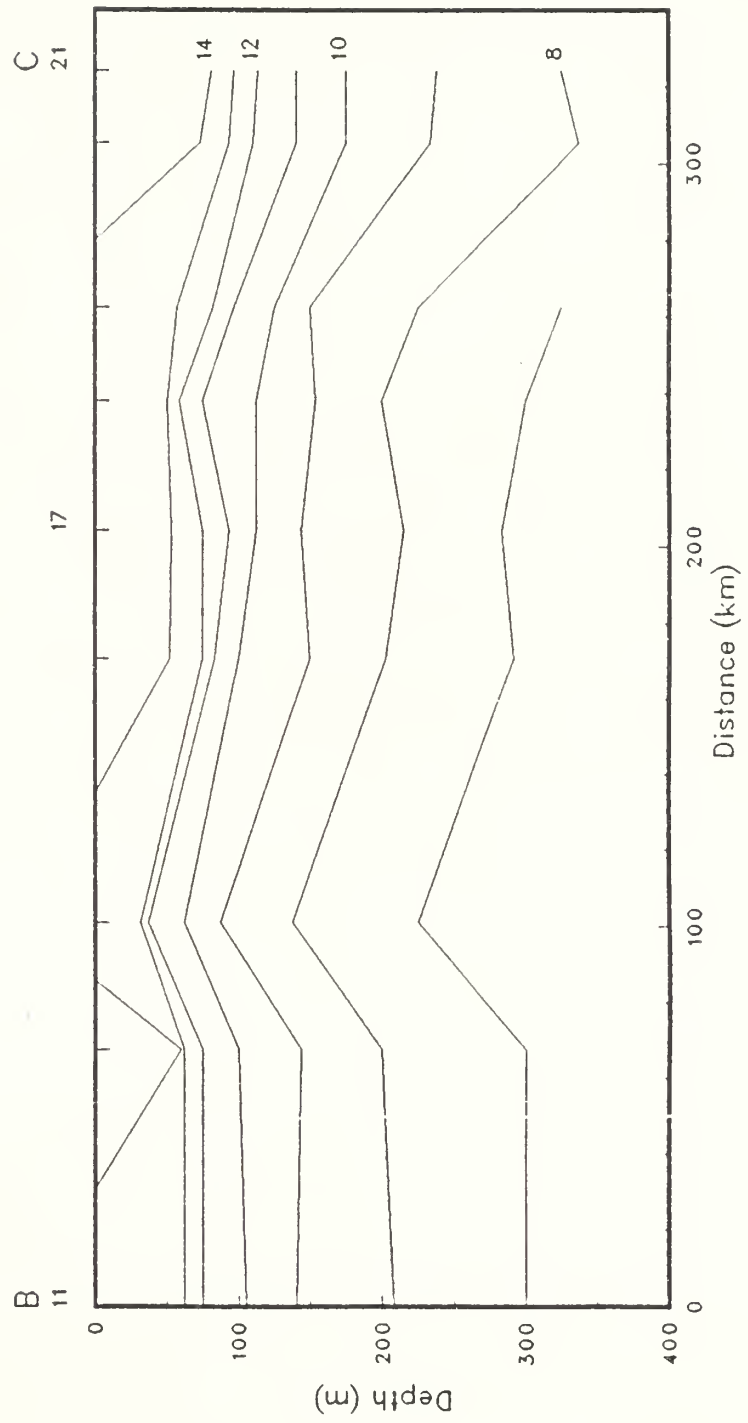


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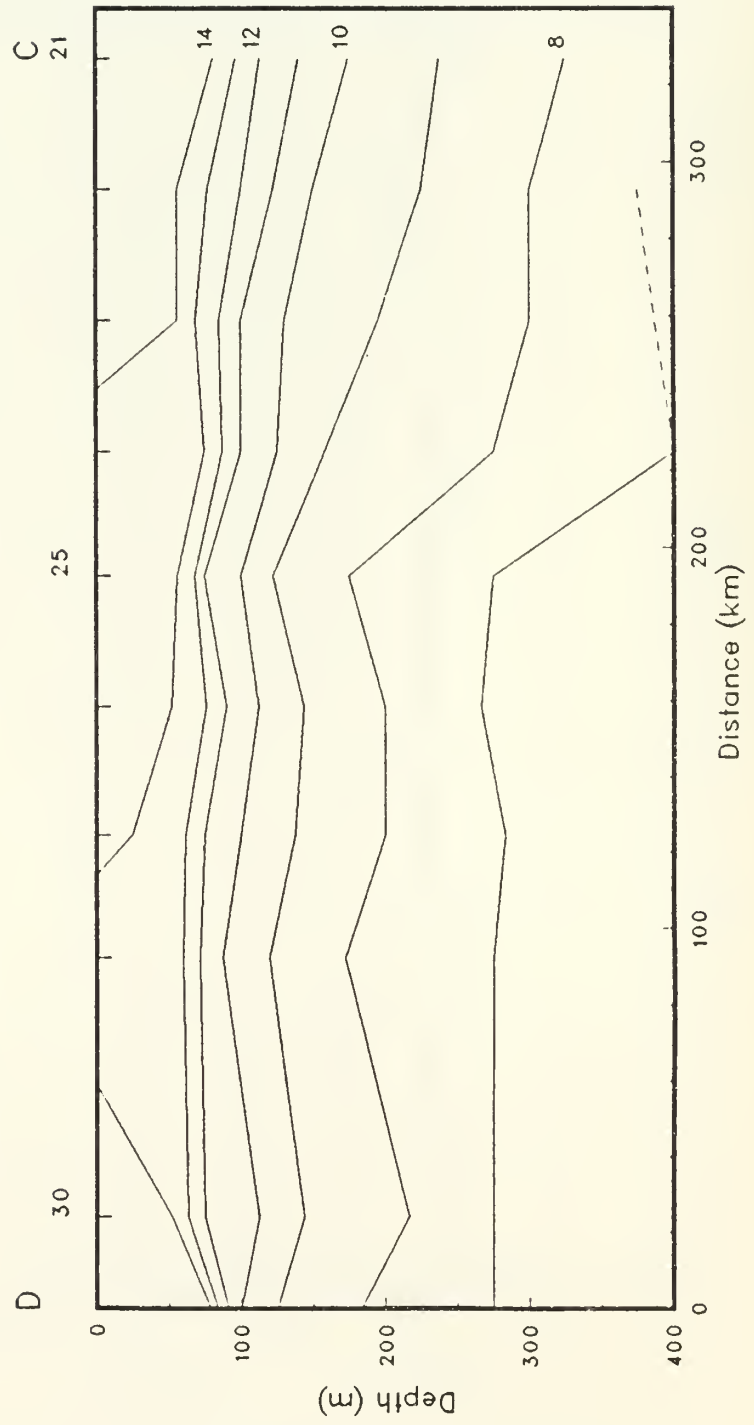


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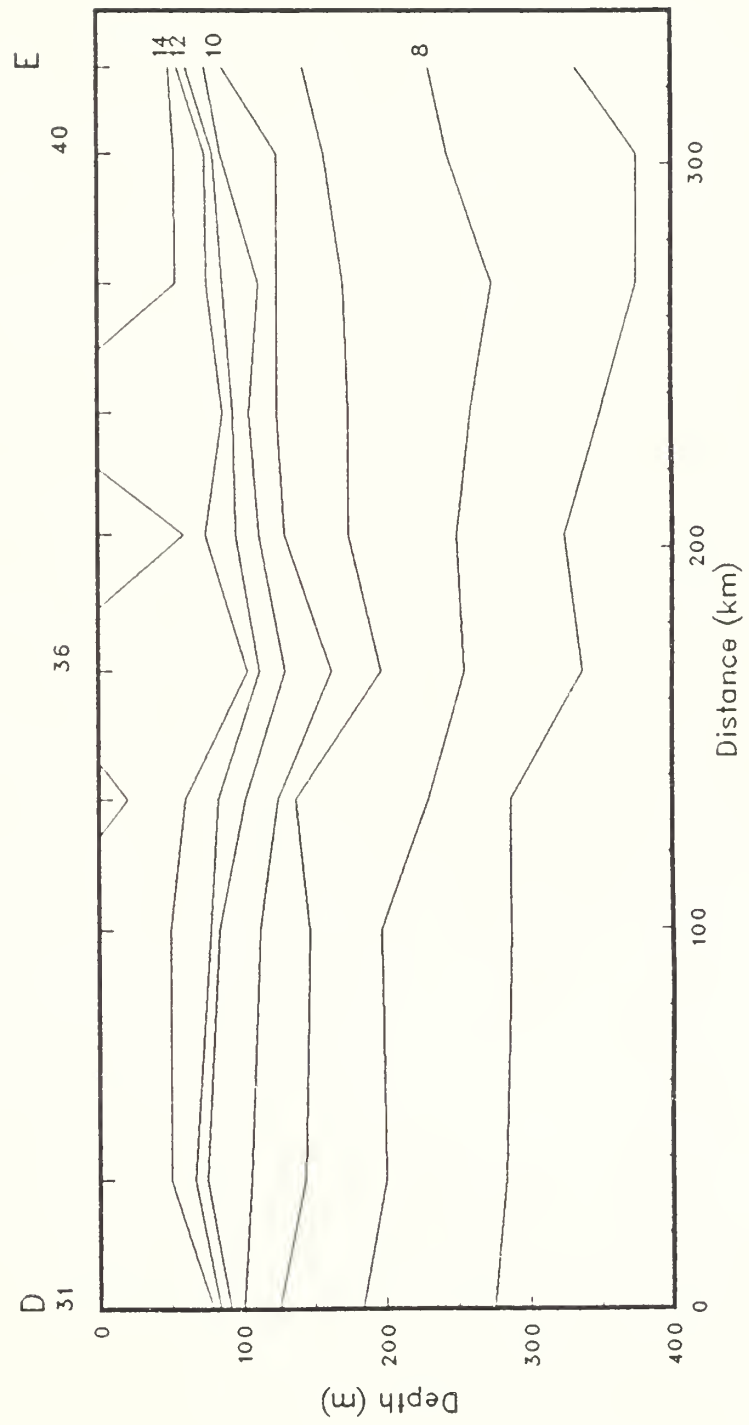


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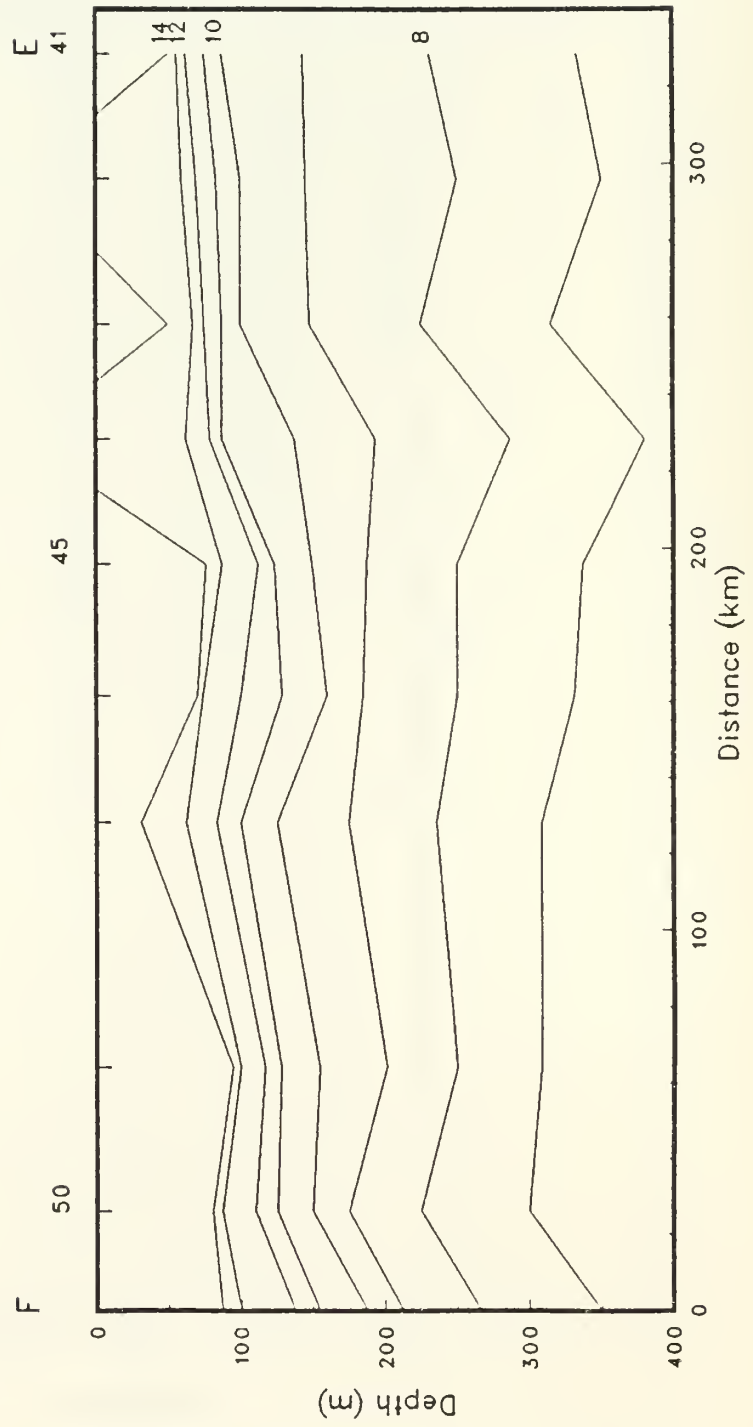


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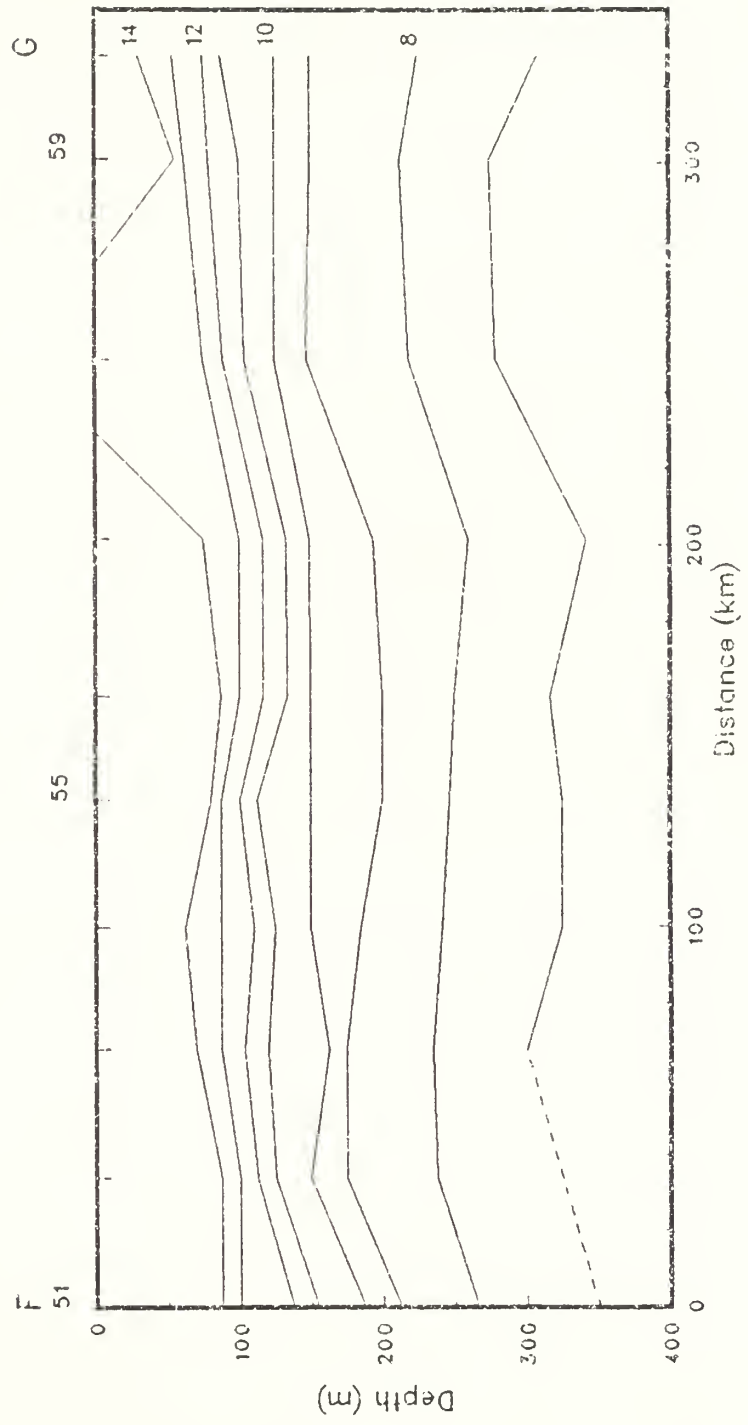


Figure 6(f).

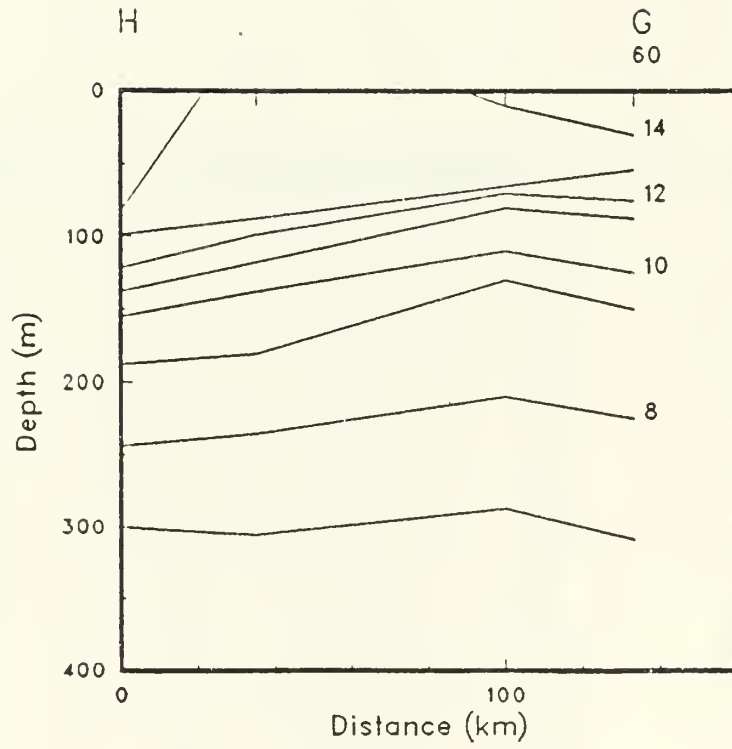


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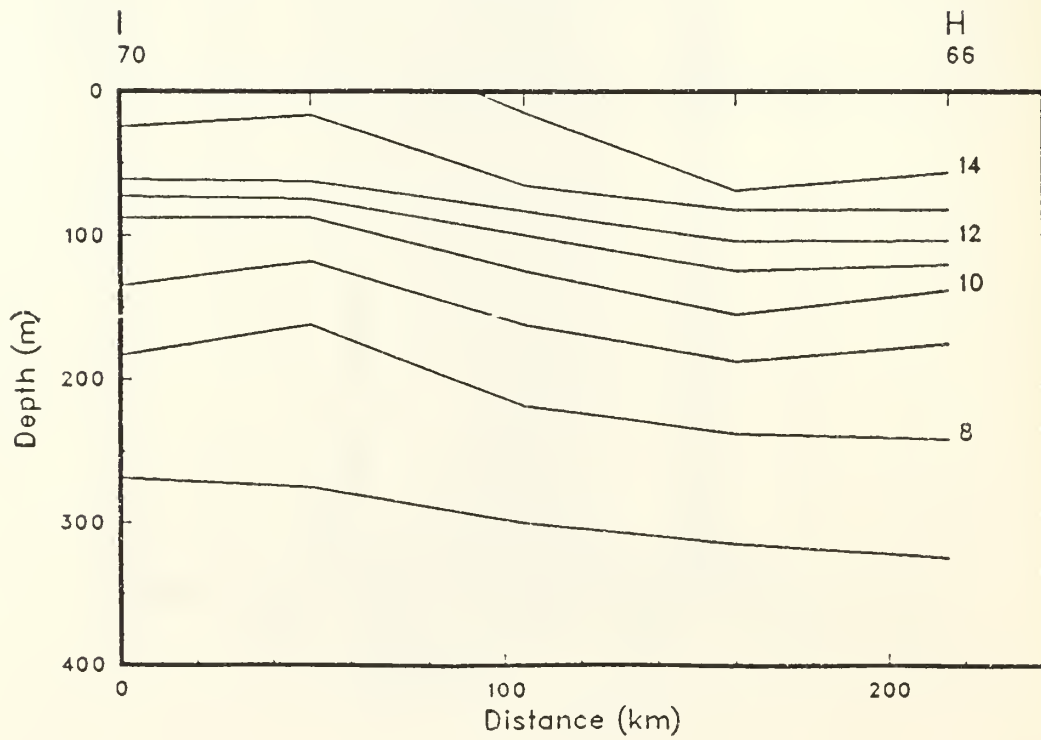


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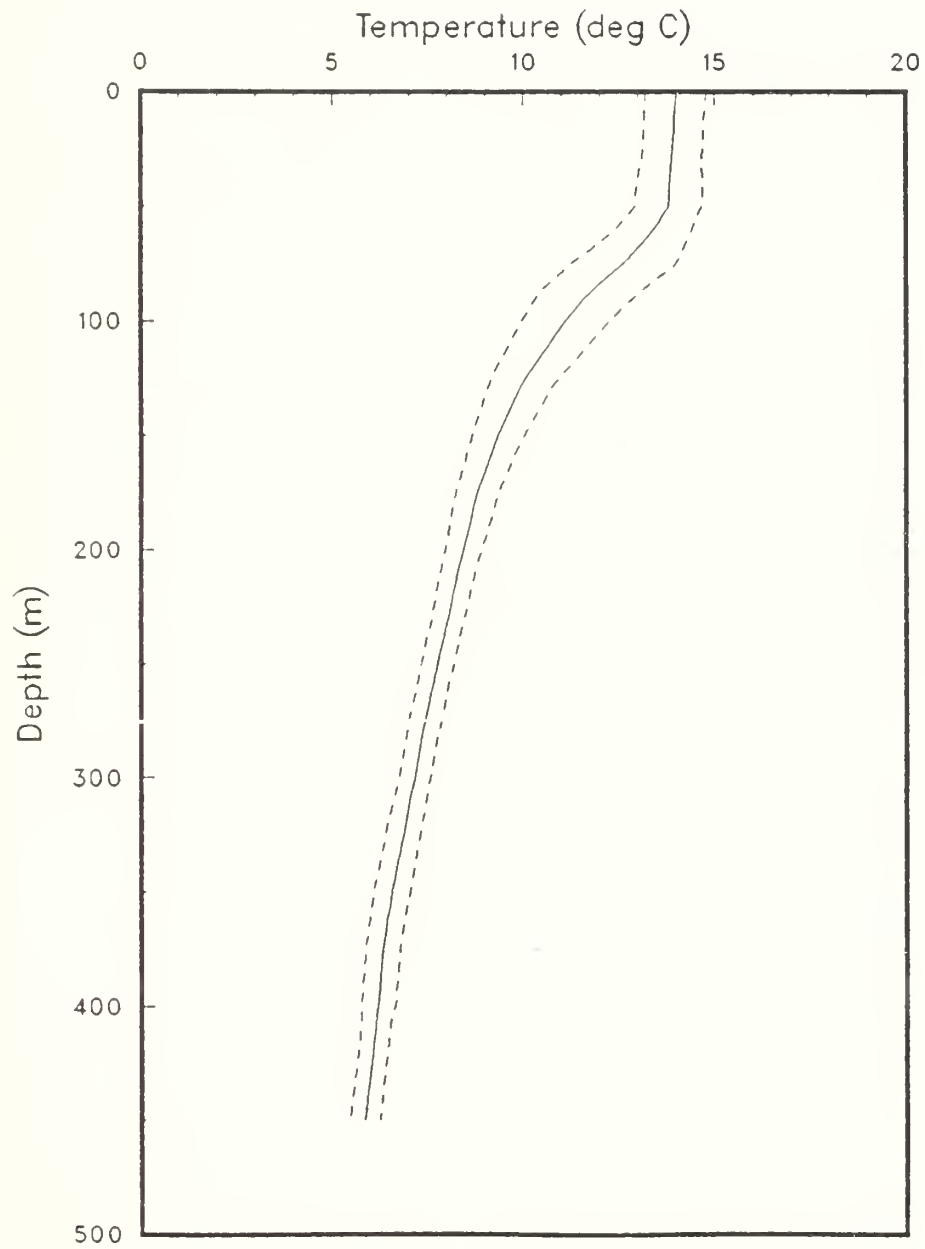


Figure 7: Profile of $\bar{T}(z)$ with + and - the standard deviation (OPTOMA3).

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